

Message

From: Hensel, Bruce [bhensel@epri.com]
Sent: 2/18/2019 5:36:01 PM
To: Johnson, Barnes [Johnson.Barnes@epa.gov]
CC: Chu, Paul [PCHU@epri.com]
Subject: EPRI Evaluation of Alternative Liners at CCP Sites
Attachments: White Paper_Relative_Liner_Modeling_FINAL.PDF; White Paper_Conceptual_Review_FINAL.PDF

Barnes,

Following up on our meeting of 11/28/18, attached to this email are two white papers describing EPRI research to evaluate alternative liners relative to the composite liner specified in the CCR Rule. Here are some key points from this research:

- Both white papers show that composite liners are most effective in terms of limiting seepage out of a CCP unit. As noted in the conceptual review, the composite liner is effective in nearly any hydrogeologic environment.
- Both white papers also show that, under favorable hydrogeologic conditions, some alternative liners can achieve overall performance approaching that of composite liners.
- The conceptual review describes a methodology for evaluating the performance of natural clay liners that are already in place, and which goes a step beyond monitoring wells at the perimeter of the facility.
- The conceptual review notes that methods for seam-welding, one of the reasons for specifying an HDPE thickness of 60-mil, have greatly improved over the past 30 years.
- The relative liner modeling, based on a modeling approach that mimicked the 2014 risk assessment whenever possible, but where results were evaluated at the compliance boundary rather than a variably placed receptor, provided results indicating no appreciable difference between a 40-mil HDPE composite liner (simulated by assuming twice as many defects) and the base-case 60-mil HDPE composite liner.
- The relative liner modeling provided results showing that natural clay liners can achieve concentration profiles approaching the base case composite provided hydraulic conductivity is 10^{-8} cm/s or lower, and assuming reasonably consistent hydrogeology. Maximum modeled concentrations were higher than the base case, but lower than reference health based numbers (MCL or RSL) at the 80th to 90th percentiles as calculated at the point of compliance. Sensitivity analyses explored the impact of several conservative assumptions used in the modeling such as a saturated natural clay liner (vs unsaturated), and having a vertical hydraulic gradient of 1.0 (versus a lower vertical gradient if the underlying aquifer is confined).

Please note that the attachments are too large for emailing. We have established a Box account that I can make available to EPA so you can download model files and supporting documentation for a case study. Please let me know if this is an appropriate method to provide these files to EPA.

We will eventually combine the white papers into an EPRI technical report. If EPA opens a comment period for its Phase 1 part 2 of Phase 2 amendments to the CCR Rule, we will include this information (white papers or technical report, depending on timing) in our comments.

Please do not hesitate to contact me to discuss any aspects of this work. I could also come to DC to present results to EPA if that would be beneficial to your staff.

Thanks

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